HARVARD COLLEGE OBSERVATORY
CAMBRIDGE 38, MASSACHUSETTS

RADIO METEOR PROJECT

Contract NASr-158

Director: Dr. Fred L. Whipple

Principal Investigator: Dr. Gerald S. Hawkins

NASA QUARTERLY STATUS REPORT NO. 9

February 1 - April 30, 1965

May 15, 1965

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The radar system of the Radio Meteor Project continued on its regular schedule of alternate week operation, excepting only the additional coverage of the Lyrids as the initial step in surveying the major meteor streams under a contract being negotiated between the NASA Manned Space Flight Center and the Smithsonian Astrophysical Observatory. Influx rates at four levels (7 1/2, 10, 12 1/2, and 15) will be provided. SAO is arranging for additional transmitter time from the National Bureau of Standards, amounting to an increase of about 37% above the current level of operation for the Radio Meteor Project. The NASA Manned Space Flight Center will be responsible for conducting the analysis; SAO will provide all necessary supporting personnel, computing, etc.

Reduction of data at the Observatory increased during the quarter to a new high. 3,372 meteors were measured and 3,488 were completely reduced. Figure 1 shows the monthly rate of measurement between January, 1962, and May, 1965. In the future, it is expected that an average of better than 1,000 meteors per month will be maintained. Commencing immediately, measuring priority will be given to stream meteors so that the lag between observation and final reduction will be minimized. The present backlog of films to be measured has been cut to less than eleven months, and by early 1966 all backlog should be entirely eliminated.

Components have been purchased for the construction of the five digital logic units required at each outlying site for gathering of wind data. Completion of these units is expected within six weeks and installation planned by the end of June.

Design has commenced on a device for providing range. There will be a separate unit built for input from each site, but all will be located together at the central site for ease of maintenance. Completion of the device is expected in July.

The Digitizer remains in the manufacturer's plant in Waltham, Massachusetts, where it has been undergoing tests. A need to have several modifications and improvements made in the Digitizer led to a proposal from Baird-Atomic which was forwarded

to NASA Contracts Office with our request for approval.

Also pending is a subcontract to Advanced Development Laboratories, Nashua, New Hampshire, for engineering services in a system integration effort aimed at elevating the Illinois central field station to a more efficient level of operation. Our request for authorization to enter into this subcontract was submitted to NASA in mid-February of this year.

Progress has been rather slow in construction of five phase receiving systems being built under subcontract by Aerospace Research, Inc., Brighton, Massachusetts. No serious technical difficulties have arisen, but a late start was made and we do not expect final integration of the equipment at the field sites until July.

Of interest here to relate briefly is the status of the overall effort toward gathering wind data with the meteor radar system. Under contract AF 19 (628)-3248 with the Air Force Cambridge Research Laboratories, SAO has successfully developed and tested prototype phase receiving equipment and this is now installed at the central site. Additional equipment has been procured to instrument two new "remote" sites designated Station 7 and Station 8 in Figure 2. Transmission of data from the new sites will be over microwave links made available as GFE by the Air Force. Telephone lines to all sites will be installed within the next two months in order to transmit a 2.5 kc reference tone outward from the central site, demonstrated to be unfeasible over microwave links with the required phase stability. All required equipment necessary for gathering wind data is scheduled for installation before August, so we anticipate commencement of data processing shortly thereafter. Figure 2 shows a block diagram of the central site; Figure 3 indicates the general system layout.

Research Report No. 12, entitled, Masses, Magnitudes, and Densities of 320 Radio Meteors, was prepared by Franco Verniani and Gerald S. Hawkins. This report is a continuation of the statistical analysis carried out by Hawkins and Southworth (Harvard Radio Meteor Project Research Report No. 2, 1963) and concerns the same observational material. A recent revision of the mass scale (Verniani and Hawkins, 1964) has been taken into account and the present values for masses and densities supercede the values quoted in Research Report No. 2.

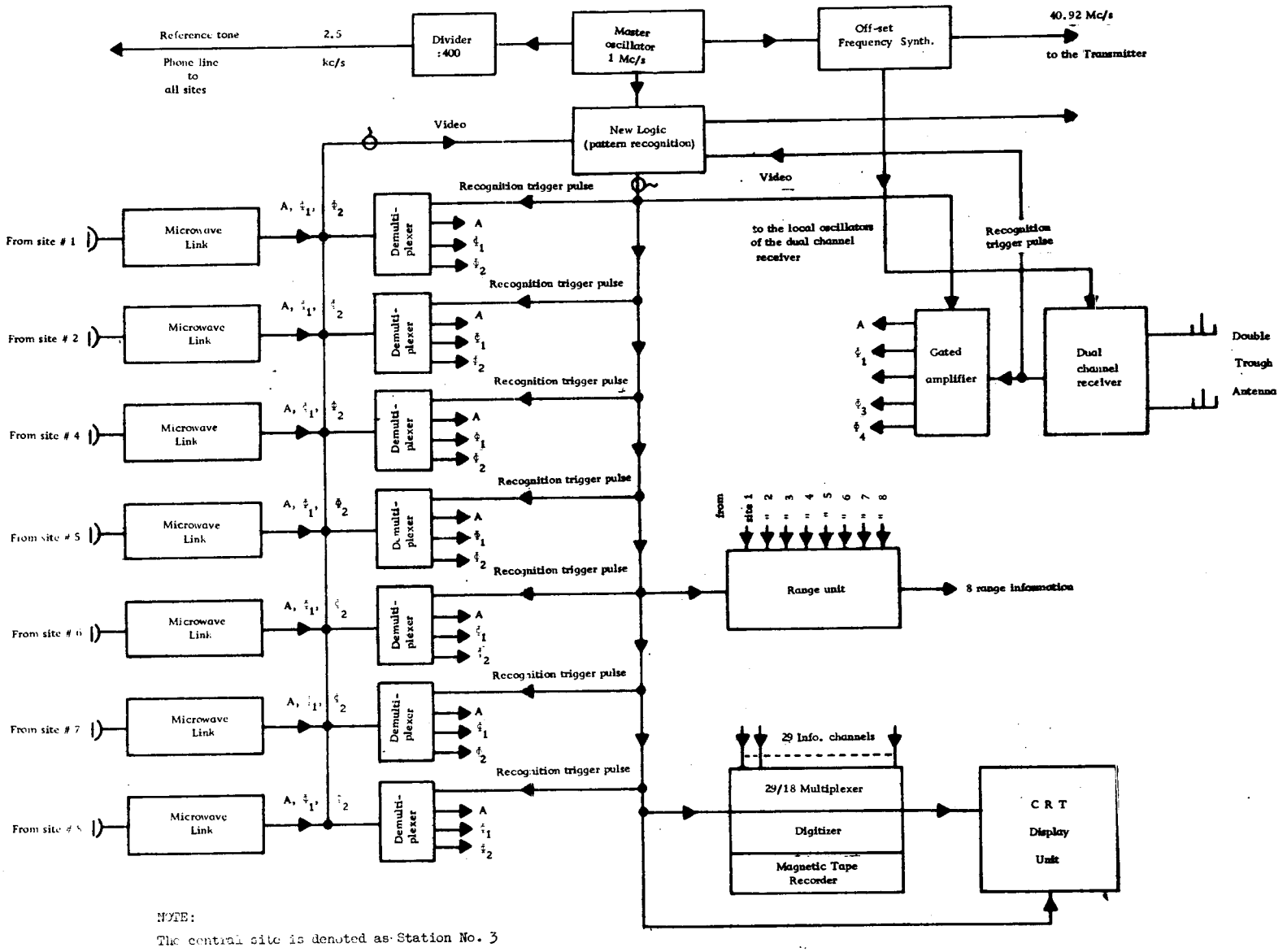

Figure 2. Central site, simplified block diagram.

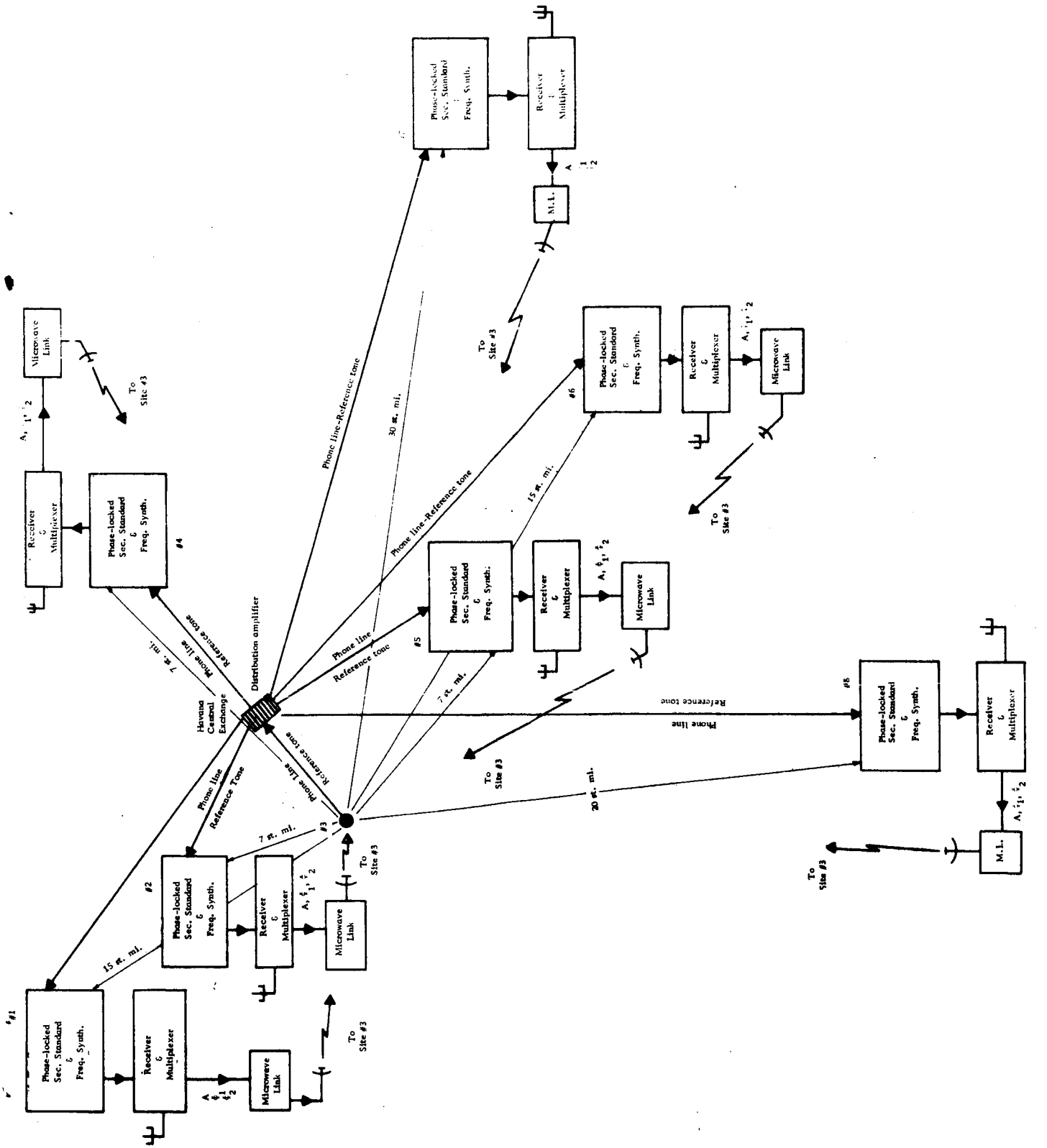

Figure 3. General system layout.